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SUITE 4700

DENVER, CO 80202

EXAMINER

KIM, PAUL

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/748,104	<b>Applicant(s)</b> CHONG, FAY	
	<b>Examiner</b> PAUL KIM	<b>Art Unit</b> 2169	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8-15,17-20,22-29,31-34 and 36-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-15,17-20,22-29,31-34 and 36-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/29/2008</u> .   | 6) <input type="checkbox"/> Other: _____                          |

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### **DETAILED ACTION**

1. This Office action is responsive to the following communication: Amendment filed on 28 October 2008.
2. Claims 1, 3-6, 8-15, 17-20, 22-29, 31-34 and 36-43 are pending and present for examination.

### ***Response to Amendment***

3. No claims have been amended.
4. No claims have been further cancelled.
5. No claims have been newly added.

### ***Information Disclosure Statement***

6. The information disclosure statement (IDS) submitted on 29 September 2008 in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Specification***

7. As per the objection to the Specification, Applicant's amendment has been acknowledged. Accordingly, the objection has been withdrawn.

### ***Claim Rejections - 35 USC § 101***

8. As per the rejections under 35 U.S.C. 101, Applicant's amendment has been acknowledged. Accordingly, the objection has been withdrawn.

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***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. **Claims 1, 6, 11, 15, 20, 25, 29, 34, 39, and 43** are rejected under 35 U.S.C. 102(e) as being anticipated by DeKoning (U.S. Patent No. 6,691,245, hereinafter referred to as DeKoning), filed on 10 October 2000, and issued on 10 February 2004.

11. **As per independent claims 1, 15, 29, and 43**, DeKoning teaches:

A method for preserving data in a data storage system, the method comprising:

receiving a command to preserve data in the data storage system {See DeKoning, C8:L1-12, wherein this reads over "synchronization updates between the local and remote storage device 108 and 110 occur at predetermined periodic intervals"};

receiving a first data being written to a data block on a first storage volume prior to receiving the command {See DeKoning, C7:L63-66, wherein this reads over "all 'write' procedures to the local storage device 108 by the local host device 106 lead to synchronization updates to the remote storage device 110"};

determining whether the data block is stored on a first storage image, the first image being a copy on write snapshot of the first storage volume created in response to the command, the operation of determining based on indication information associated with the first storage image {See DeKoning, C7:L6-21, wherein this reads over "checkpoint information 116a is maintained with and correlated to the local volume 128 and its mirrored volume 132, and checkpoint information 116b is maintained with and correlated to the local volume 130 and its mirrored volume 134"};

writing the first data to the data block on the first storage image and a second storage image when the data block is stored on the first storage image {See DeKoning, C8:L13-17, wherein this reads over "[u]pon performing a synchronization update procedure between the local and remote storage devices 108 and 110, new data 152 from the host device 106 that is stored in local volume 128 is mirrored in mirrored volume 132"};

writing the first data to the data block on the second storage image when the data block is stored on a second image {See DeKoning, C8:L13-17, wherein this reads over "[u]pon performing a synchronization update procedure between the local and remote storage devices 108 and 110, new data 152 from the host device 106 that is stored in local volume 128 is mirrored in mirrored volume 132"}; and

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wherein the data storage system is read/write accessible by at least one application and read/write access to the data storage system remains available by the at least one application during the data preservation {See DeKoning, C9:L10-C10:L37, wherein this reads over "[u]pon performing a fail-over procedure, data and information is exchanged between the business continuance client 115 (FIG. 1), the other client devices 104, the remote host device 109 and the remote storage device 110" and "[a]n exemplary checkpoint procedure 182 for periodically synchronizing stored data throughout the mirrored storage system"}.

12. **As per dependent claims 6, 20, and 34, DeKoning teaches:**

The method of claim 1, further comprising:

receiving a second data being written to the data block on the second storage volume after receiving the command {See DeKoning, C9:L10-13, wherein this reads over "the client devices 104 (FIG. 1) switch from using the local host and storage devices . . . to using the remote host and storage devices . . . for primary data storage"};

determining whether the data block is stored on the first storage image or the second storage image {See DeKoning, C7:L6-21, wherein this reads over "checkpoint information 116a is maintained with and correlated to the local volume 128 and its mirrored volume 132, and checkpoint information 116b is maintained with and correlated to the local volume 130 and its mirrored volume 134"};

when the data block is stored on the second storage image, replicating the data block on the second storage image to the first storage image {See DeKoning, C9:L39-44, wherein this reads over "[t]he remote storage device 110 replaces the data in the affected data volumes 126 with the volume image"} and updating the indication information {See DeKoning, C9:L13-18, wherein this reads over "data and information is exchange between the business continuance client . . . the remote host device 109 and the remote storage device 110 according to the exemplary data flow chart show in FIG. 5"}; and

writing the second data to the data block on the second storage image {See DeKoning, C9:L10-13, wherein this reads over "the client devices 104 (FIG. 1) switch from using the local host and storage devices . . . to using the remote host and storage devices . . . for primary data storage"}.

13. **As per dependent claims 11, 25, and 39, DeKoning teaches:**

The method of claim 1, further comprising:

receiving a request to read from a data block on the first storage volume {See DeKoning, C6:L63-65, wherein this reads over "The data volumes 124 are typically accessed by the local host device 106 (FIG. 1) according to access requests from the client devices 104 (FIG. 1). After failure of the local host and/or storage device 106 or 108 (FIG. 1), the data volumes 126 are typically accessed by the remote host device 109 according to the access requests from the client devices 104."};

determining whether the data block is stored on the first storage image or on the second storage image, based on indication information associated with the first storage image {See DeKoning, C6:L63-65, wherein this reads over "The data volumes 124 are typically accessed by the local host device 106 (FIG. 1) according to access requests from the client devices 104 (FIG. 1). After failure of the local host and/or storage device 106 or 108 (FIG. 1), the data volumes 126 are typically accessed by the remote host device 109 according to the access requests from the client devices 104."};

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reading the data block from the first storage image if the data block is stored on the first storage image<sup>1</sup>; and

reading the data block from the second storage image if the data block is stored on the second storage image.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. **Claims 3, 8, 17, 22, 31, and 36** are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning, in view of Arnon et al (U.S. Patent No. 6,493,796, hereinafter referred to as Arnon), filed on 1 September 1999, and issued on 10 December 2002.

16. **As per dependent claims 3, 17, and 31**, while DeKoning fails to expressly disclose the use of "a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the first storage image," Arnon discloses a means for checking a table to see if there is a mirroring link operational for the mirroring group {See Arnon, Figures 4A-B and 5; and C17:L2-12, wherein this reads over "checking the mirroring link status flags in the table 402 associated with the mirroring group 107 in which the destination storage device 110 is included to determine whether at least one mirroring link 112 is operational for the mirroring group 108"}. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above invention suggested by DeKoning by combining it with the invention disclosed by Arnon. That is, the

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<sup>1</sup> The Examiner notes that lines 6-9 of the claims present optionally recited language in that reading the data blocks from the first and second storage image only occur "if the data block is stored on the first storage image" and "if the data block is stored on the second storage image" respectively. Accordingly, since said optionally recited language lacks patentable weight, prior art references will not be applied for the purposes of this examination.

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inclusion of the disclosed invention in Arnon would provide a means for determining whether the data block is stored on the first image.

One of ordinary skill in the art would have been motivated to do this modification so that a lookup table may be utilized in the organization of data blocks and their corresponding storage images.

17. **As per dependent claims 8, 22, and 36**, while DeKoning fails to expressly disclose the use of "a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the first storage image," Arnon discloses a means for checking a table to see if there is a mirroring link operational for the mirroring group {See Arnon, Figures 4A-B and 5; and C17:L2-12, wherein this reads over "checking the mirroring link status flags in the table 402 associated with the mirroring group 107 in which the destination storage device 110 is included to determine whether at least one mirroring link 112 is operational for the mirroring group 108"}. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above invention suggested by DeKoning by combining it with the invention disclosed by Arnon. That is, the inclusion of the disclosed invention in Arnon would provide a means for determining whether the data block is stored on the first image.

Additionally, it is noted that the claims optionally recite the method step of "creating the entry associated with the data block" as the creation of said entry is only done "if the entry does not exist." Accordingly, for the purposes of this Office action, prior art will not applied to the aforementioned optional method step.

One of ordinary skill in the art would have been motivated to do this modification so that a lookup table may be utilized in the organization of data blocks and their corresponding storage images.

18. **As per dependent claims 12, 26, and 40**, while DeKoning fails to expressly disclose the use of "a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the first storage image," Arnon discloses a means for checking a table to see if there is a mirroring link operational for the mirroring group {See Arnon, Figures 4A-B and 5; and C17:L2-12, wherein this reads over "checking the mirroring link status flags in the table 402 associated with the

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mirroring group 107 in which the destination storage device 110 is included to determine whether at least one mirroring link 112 is operational for the mirroring group 108”}. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above invention suggested by DeKoning by combining it with the invention disclosed by Arnon. That is, the inclusion of the disclosed invention in Arnon would provide a means for determining whether the data block is stored on the first image.

Additionally, it is noted that the claims optionally recite the method step of “creating the entry associated with the data block” as the creation of said entry is only done “if the entry does not exist.” Accordingly, for the purposes of this Office action, prior art will not applied to the aforementioned optional method step.

One of ordinary skill in the art would have been motivated to do this modification so that a lookup table may be utilized in the organization of data blocks and their corresponding storage images.

19. **Claims 4, 9, 18, 23, 32, and 37** are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning, in view of Mutalik et al (U.S. Patent No. 7,149,787, hereinafter referred to as Mutalik), filed on 7 June 2001, and issued on 12 December 2006.

20. **As per dependent claims 4, 9, 18, 23, 32, and 37**, while DeKoning fails to expressly disclose the use of locks in storing data to a data block, Mutalik discloses a means for acquiring and releasing a lock {See Mutalik, C14:L47-57, wherein this reads over a implementations of a read-lock and a write-lock”}. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above invention suggested by DeKoning by combining it with the invention disclosed by Mutalik. That is, the inclusion of the disclosed invention in Mutalik would provide a means for locking the second storage image for write purposes.

One of ordinary skill in the art would have been motivated to do this modification so that other processes and/or users may not access the data block while a write process is underway such that the data block may not be erroneously corrupted by said other processes and/or users.



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21. **Claims 13, 27, and 41** are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning, in view of Arnon, and in further view of Mutalik.

22. **As per dependent claims 13, 27, and 41**, while DeKoning and Arnon fail to expressly disclose the use of locks in storing data to a data block, Mutalik discloses a means for acquiring and releasing a lock {See Mutalik, C14:L47-57, wherein this reads over a implementations of a read-lock and a write-lock"}. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above inventions suggested by DeKoning and Arnon by combining it with the invention disclosed by Mutalik. That is, the inclusion of the disclosed invention in Mutalik would provide a means for locking the second storage image for write purposes.

One of ordinary skill in the art would have been motivated to do this modification so that other processes and/or users may not access the data block while a write process is underway such that the data block may not be erroneously corrupted by said other processes and/or users.

23. **Claims 5, 10, 14, 19, 24, 28, 33, 38, and 42** are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning, in view of Mutalik, and in further view of Official Notice.

24. **As per dependent claims 5, 10, 14, 19, 24, 28, 33, 38, and 42**, while DeKoning and Mutalik fail to expressly disclose that "the lock mechanism is maintained independent to the first and the second storage images," the Examiner takes Official Notice that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have said lock mechanism be separate and independent from the first and second storage images. That is, one of ordinary skill in the art would ably recognize that having an independent lock mechanism such that the lock mechanism not take part in the backup operation.

***Response to Arguments***

25. Applicant's arguments filed 2 June 2008 have been fully considered but they are not persuasive.

a. Rejections under 35 U.S.C. 102

Applicant asserts the argument that DeKoning fails to teach amended claim limitation of "the data storage system is read/write accessible by at least one application and read/write access to the data storage system remains available by the at least one application during the data preservation." See Amendment, page 12. The Examiner disagrees. While DeKoning discloses "the local host device 106, quiesces, or suspends, any applications running on the local host device," the Examiner notes that the checkpoint procedure 182 which is initiated by the local host device during the synchronization process may be considered an application. See DeKoning, C9:L63-C10:L14. The Applicant rebuts this assertion by asserting that "the checkpoint procedure of DeKoning is not an application that has read/write accessibility to the data storage system." See Amendment, page 12. The Examiner respectfully disagrees. It is noted that said checkpoint procedure (i.e. the application) is used to update the affected data volumes by forwarding the checkpoint information such that said checkpoint information may be written accordingly. Therefore, it is noted that DeKoning discloses at least one application (i.e. the checkpoint procedure) wherein read/write access to the data storage system remains available (i.e. reading and writing updates to snapshots). Wherein the checkpoint procedure is initiated by the local host device which is a component of the data storage system, it would have been obvious to one of ordinary skill in the art that the data storage system would be read/write accessible by the checkpoint procedure.

Accordingly, the rejections under 35 U.S.C. 102 are sustained.

***Conclusion***

26. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL KIM whose telephone number is (571)272-2737. The examiner can normally be reached on M-F, 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tony Mahmoudi can be reached on (571) 272-4078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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